

The variable star of Ceraski, the true period of which was determined at Harvard College, is referred to; systematic observations have been made upon it. The Report describes the progress made in observations with the "meridian photometer," whereby it is intended to determine the light of all stars visible to the naked eye between the North Pole and N.P.D. 120°. The principal want of the Observatory at the present time is stated to be the means of publication of these and other classes of observations, the large number of volumes issued during the last five years having exhausted the funds specially appropriated for defraying expenses of publication.

CERASKI'S VARIABLE STAR T CEPHEI.—Prof. Julius Schmidt, from his own observations of minima of this variable in the last five months of the past year, finds reason to conclude that in that interval each successive period was longer by 0.08753m. or 5.25s. than the preceding one, and has calculated the times of minima upon this assumption between June 11, 1880, and February 15, 1881. For elements with this correction to the period to be applied, he adopts for his starting-point—

Minimum ... 1880, December 7, 10h. 6.7m.
Athens M.T. + 2d. 11h. 50.812m. E.

E being the number of periods from December 7. Thus the next minimum is found to occur on February 5, at 6h. 50.3m. Athens time, or at 5h. 15.4m. M.T. at Greenwich. Prof. Schmidt has remarked what we believe was soon detected by Mr. Knott from his observations in October last, that for more than two hours about the minimum there is no perceptible variation of brightness; decrease and increase are very rapid, particularly the latter.

SWIFT'S COMET, 1880 ϵ .—The Superintendent of the Observatory at Washington, Admiral Rodgers, communicates to *Science* of January 10, an orbit of this comet which has been calculated by Prof. Frisby from three meridian observations made there on October 25 and November 7 and 25, and without any assumption as to the periodic time. The revolution resulting from this application of the general method is about 2178 days, or a little less than six years, and thus the conclusion arrived at by MM. Schulhof and Bossert of Paris, and Mr. S. C. Chandler of Boston, U.S., receives confirmation. From the position of the orbit it happens at present that only every second return to perihelion can be made available for observations.

BARON DEMBOWSKI.—Practical astronomy has sustained a severe loss in the death of Baron Ercole Dembowski, which took place on the evening of the 19th ult. at Monte, Frazione di Solbiate, Arno. Few have attained as great skill or exhibited greater industry and patience in that somewhat difficult and tedious branch, the measurement of the double stars, to which the Baron specially devoted himself, and we hope some means may be found of publishing in a collective form the results of his long-continued labours in this direction.

METEOROLOGICAL NOTES

OUR readers will learn with much satisfaction that Sweden has resolved to take part in the international meteorological and magnetical observations in the Polar regions, and arrangements have been made for carrying on the observations from June 1, 1882, till June 1, 1883. The house erected at Masselbay in Spitzbergen by Nordenskjöld's expedition, is still in good condition, and will be fitted up for the observatory. In connection with the Spitzbergen Observatory, Haparanda, at the head of the Gulf of Bothnia, is to be created into a first-class observatory, and furnished with Theorell's self-registering and printing meteorological apparatus; and all other observations will be made which are expected of a first-class observatory. M. Hjeltström is appointed director of the Haparanda Observatory. The funds to meet the expenses of the expedition and the two observatories have been most generously supplied by M. L. O. Smith, Stockholm. Prof. Hildebrandsson, the eminent Swedish meteorologist, has been entrusted with the discussion of the observations made by Prof. Nordenskjöld on the celebrated *Vega* Expedition, to the publication of which meteorologists will look forward with the liveliest interest.

IN his fourteenth contribution to meteorology Prof. Loomis returns to the discussion of the interesting question of the course and velocity of storm centres in tropical regions. In a previous communication he had shown that in middle latitudes the average

progress of storm centres corresponds pretty closely with the average direction of the prevailing wind of these latitudes. In marked contradistinction to this result is that now obtained regarding the course of the intertropical cyclones which occur within the region of the North-east Trade Winds. These cyclones, instead of following the ordinary course of the Trades towards the south-west, advance westward, but in a direction somewhat north of west.

DURING the winter months, storms while crossing the United States frequently advance during a part of their course from north-west to south-east. This course is followed most frequently in the region between the Rocky Mountains and the Mississippi, is seldom continued as far south as lat. 30°, and the storm centre, after reaching its most southerly point, often changes its course towards the north-east. Storms which cross the United States north of lat. 38° generally pursue a course a little to the north of east; while those which come from south of that latitude pursue a course nearly north-east. During the summer months however few storms travel south of lat. 38°, and during this part of the year the average course of storms is almost exactly towards the east.

PROF. LOOMIS next institutes a comparison between the West India hurricanes and those of the Bay of Bengal, China Sea, &c. The average course of the latter is towards the west, ranging from 13° south of west to 86° north of west, which agrees closely in this respect with the general course pursued by West India hurricanes. The velocity of their onward course is however markedly different, being only about eight miles per hour, which is less than half the average velocity of the West India cyclones. The average latitude when the course becomes north is nearly lat. 20°, being 10° more to southward than in the West Indies, and the velocity during this part of the course is only about nine miles an hour. Ultimately the cyclones curve round and pursue a course nearly east-north-east, with a velocity of onward movement scarcely reaching ten miles an hour, or less than half of the velocity found for West India hurricanes. Lastly, while in the West Indies cyclones or hurricanes have been found no farther south than lat. 10° N., in Southern Asia they have occurred as far south as lat. 6° N.

THE concluding part of the Contribution is taken up with an examination of those storms of middle latitudes which advance in a westerly direction. In these cases, which may be regarded as abnormal directions, it is found that the wind is generally greatest on the east side of the low centre of the storm. While there are thus on the east side of the low pressure areas, causes tending to increase pressure on that side, there are different conditions on the west side tending to divert the winds westward, and this, Prof. Loomis thinks, is the most important reason why in such cases the storm centres advance to westward. In the United States, over the Atlantic, and in Europe, the influence of one area of low pressure upon another is a very common cause of abnormal movements of storm centres—such, for instance, as the coalescence of two low areas into one, resulting occasionally in an apparent westerly movement of the centre of lowest pressure.

THE "Results of Meteorological Observations made at Mauritius during 1877" fully sustains the high reputation of Dr. Meldrum's previous reports for fulness of detail, accuracy, and special observations not usually given in meteorological reports. The hourly monthly values have been calculated from the readings of the barograph for the year, and a valuable table is appended to this part of the report (p. 5), showing the mean monthly diurnal variation of atmospheric pressure for the three years 1875-77. The value of these results will be greatly enhanced when the thermograph which has been received has been got into working order. A comparison, a very satisfactory one, is made of the barograph readings with those of the standard barometer. As in 1876 the wind during 1877 attained its annual maximum velocity in the colder months from June to August, and its minimum in the warmer months, from November to March; and its diurnal maximum velocity from 11 a.m. to 2 p.m., and its minimum from about 2 to 5 a.m. The departures, however, from these times are such as to point to a considerable number of years' observations as required before the true average can be ascertained. Thirty-one stations for recording the rainfall are now in working order, and in each case the annual amounts available from 1862 are printed, and the averages of the years given for each station. Mean temperatures for seven stations appear in the report, the three highest

stations, with the mean temperatures for 1877, being, Curepipe (1800 feet) $68^{\circ}3$, Bonne Veine (1500 feet) $69^{\circ}5$, and Midlands (1400 feet) $73^{\circ}2$. The difference in height (400 feet) of the first and last of these, and the difference of their mean annual temperatures, $4^{\circ}9$, call for inquiry, and in connection therewith it may be suggested that a small map showing the physical features of Mauritius and the positions of the various stations would usefully illustrate these reports. As regards thunderstorms, which are carefully recorded, none occurred from May to October during 1876 and 1877, and the daily maximum is from 1 to 4 p.m., with a tendency to a secondary maximum about sunset, and the daily minimum from 10 p.m. to a little after sunrise.

In a supplement to No. 366 of the *Bulletin International* of the Paris Observatory M. Mascart gives an interesting and rapid sketch of the meteorology of Europe for December last, illustrated with two maps showing the storm-tracks over the Continent during the month. During the first half of the month the storm-tracks were all to northward of the British Isles and Denmark, and fine weather prevailed particularly in Scotland, Denmark, and Germany. In France high barometers ruled with light winds, and temperatures high for the season. The contrast afforded with the weather in France during December, 1879, is most striking; thus on December 10 of both years barometers were unusually high in France, but in 1880 the mean temperature was $50^{\circ}5$, whereas on December 10, 1879, the mean temperature was $-14^{\circ}1$. The bearings of the geographical positions of anticyclones, with their high pressures, on the temperature of the regions covered by them is a point well worthy of examination. The influence of a high-pressure area resting over the Atlantic and extending on its eastern side over Western Europe, has doubtless a very different influence on the temperature of that part of the Continent than an area of high pressure covering the Continent and terminated on its west side by France and Spain, even though the barometer be equally high over the west of Europe. During the second half of December the storm-tracks took a much more southerly course, several being as far south as the Channel and the north shores of Germany. The result was an extension south of the cold, so that in Orkney and the Hebrides temperatures were nearly $3^{\circ}0$ below the normal, on the Tweed about the normal, rising farther south to $1^{\circ}1$ above the normal in North Wales, $5^{\circ}0$ in the Channel Isles, and $6^{\circ}7$ in Paris. During December, 1879, temperature in Paris was $21^{\circ}2$ below the normal, the mean for that month being $17^{\circ}6$, or $27^{\circ}9$ colder than that of last December.

GEOGRAPHICAL NOTES

ON Tuesday night, at the Royal Institution, Mr. Edward Wympster described his ascents of Chimborazo and Cotopaxi to a distinguished audience. While purely athletic mountaineers had his sympathy in the practice of mountaineering as a sport, Mr. Wympster confessed that his sympathies were much more with those who employed their brains as well as their muscles. His journey to the Andes was to be one of work, and all its arrangements were devised so as to economise time to the uttermost. In observations for altitudes and position, in studying the manners and customs of the country, in photography and sketching, in the collection of objects of interest, from beetles on the summits of mountains to antiquities buried in the ground, he found quite sufficient to occupy his time. From Bodegas the party was composed of two Swiss mountaineers, the cousins Carrel of Val Tournanche, Mr. Perring, some muleteers, and their teams. When they reached the summit of Chimborazo, on the 3rd of January, after a most arduous climb, they found the wind blowing at the rate of 50 miles an hour, from the north-east, and driving the snow before it. With extreme difficulty, a reading of the mercurial barometer was effected. The mercury fell to $14^{\circ}1$ inches with a temperature of 21° deg. Fahr. This being worked out, in comparison with a nearly simultaneous observation at Guayaquil, gave 20,545 feet for the height of Chimborazo. They began the descent at 20 minutes past 5, with scarcely an hour and a quarter of daylight, and reached their camp (about 17,400 feet above the sea-level) about 9 p.m., having been out nearly sixteen hours, and on foot the whole time. Passing from an extinct to an active volcano, Mr. Wympster next gave an account of his journey to the crater of Cotopaxi. Observing with the telescope, during an enforced stay

at Machachi, that much less smoke or vapour was given off at night than by day, he resolved, if possible, to pass a night on the summit. On the 18th of February the party got to the edge of the crater, having passed almost the whole way from their camp at a height of 15,000 feet to the foot of the final cone over snow, and then over ash mixed with ice. The final cone was the steepest part of the ascent, and on their side presented an angle of 36° . When they reached the crater vast quantities of smoke and vapour were boiling up, and they could only see portions of the opposite side at intervals, and the bottom not at all. Their tent was pitched 250 feet from the edge of the crater, and during a violent squall the india-rubber floor of the tent was found to be on the point of melting, a *maximum* thermometer showing a temperature of 110° deg. on one side of the tent and of but 50° deg. on the other; in the middle it was $72^{\circ}5$ deg. Outside it was intensely cold, and a thermometer on the tent cord showed a *minimum* of 13° deg. At night they had a fine view of the crater, which has a diameter from north to south of 2000 feet, and from east to west of about 1500 feet. In the interior the walls descend to the bottom in a series of steps of precipice, and slope a good thousand feet, and at the bottom there was a nearly circular spot of glowing fire, 200 feet in diameter. On the sides of the interior higher up, fissures, from which flickering flames were leaping, showed that the lava was red hot a very short distance below the surface. The height he found to be 19,600 feet. The party remained at the top for twenty-six consecutive hours, sleeping about 130 feet below the loftiest point. At first they had felt the effects of the low pressure of the atmosphere, and again, as at Chimborazo, took chlorate of potash with good effect. All signs of mountain sickness had passed away before they commenced the descent, and did not recur during the journey. Nearly five months later Mr. Wympster returned to Chimborazo, and from a second reading of the barometer at $14^{\circ}028$ inches, with a temperature of 15° deg. Fahrenheit, he made the height 20,489 feet, the mean of the two readings giving 20,517 feet. While on the side of Chimborazo he witnessed a magnificent eruption of Cotopaxi, ashes rising in a column 20,000 feet above the rim of the crater and then spreading over an area of many miles. Prof. Bonney had submitted the ash to microscopic examination, and found that the fineness varied from 4000 to 25,000 particles to the grain in weight, and from observation of the area over which the ash fell Mr. Wympster calculated that at least two million tons must have been ejected in this one eruption.

A TELEGRAM was read at a recent meeting of the French Academy of Sciences from M. de Brazza, who has been conducting an exploration in the region of the Ogowé and Congo, West Africa. Quite recently a French station has been founded in the upper course of the former river in connection with the International African Association. In July last, M. de Brazza informs the Academy, he reached the Congo from this station on the Ogowé, between the river Inpaka Mpania and the river "Lawson Afrisi." Gaining the favour of King Makoko he pacified the tribes on the right bank of the Congo, and peacefully descended the river in a canoe. On October 3 he founded the station of Ntamo Ncoma on land ceded by King Makoko on the right bank of the Congo. M. de Brazza surveyed the route between the Ogowé and Congo; it is twelve marches in length, over a plateau of an average height of 800 metres. The country is healthy, and the population dense and peaceful. In November last M. de Brazza arrived at Mdambi Mbongo, the advanced post of Mr. Stanley, whom he met, and with whom he reached the latter's headquarters at Vivi on November 12. If the new station can be maintained and virtualised, it is no doubt well chosen as a starting-point for further discovery, for both north and south of it there are large regions of which he knew nothing.

AT the meeting of the Geographical Society on Monday last, Mr. E. Delmar Morgan gave some account of his journey last year to Semiretchia and the town of Kulja. Being unable to make use of the more southern line of communications, Mr. Morgan travelled by the northern post-road from Orenburg to Troitsk and Petropaulofsk, and thence to Omsk and Semipalatinsk. He then struck southwards to Sergiopol, where he was detained three weeks owing to the southern road being blocked by snow. He afterwards went to Kulja for a short time, and he also made some excursions to Issyk-kul and other places of interest. In the course of the discussion which followed the paper, Mr. Ashton Dilke, the only other Englishman